Note: This is a reference cited in *AP 42, Compilation of Air Pollutant Emission Factors, Volume I Stationary Point and Area Sources.* AP42 is located on the EPA web site at www.epa.gov/ttn/chief/ap42/

The file name refers to the reference number, the AP42 chapter and section. The file name "ref02_c01s02.pdf" would mean the reference is from AP42 chapter 1 section 2. The reference may be from a previous version of the section and no longer cited. The primary source should always be checked.

AP-42 Section 12.2
Reference
Report Sect. 4
Reference 118

REPORT OF EMISSIONS TESTS

#18 COKE OVEN BATTERY COMBUSTION STACK

FRANKLIN COKE PLANT

BETHLEHEM STEEL CORPORATION
Johnstown, PA

SCC 30300306

I. C.

Bethlehem Steel Corporation

JOHNSTOWN PLANT
JOHNSTOWN, PA. 15907

T. N. CROWLEY
GENERAL MANAGER
R. H. RIGDON
M. BECKER
F. R. PULLEN
ASST. GENERAL MANAGERS

August 15, 1978

Certified Mail
Return Receipt Requested

Mr. Robert J. Clark
District Air Pollution Control Engineer
Pa. Dept. of Environmental Resources
Bureau of Air Quality & Noise Control
Prave Building - 2nd Floor
120 S. Center Street
Ebensburg, PA 15931

Dear Mr. Clark:

Attached, in accordance with the Coke Oven Emission Abatement Plan currently being negotiated, is a report in regard to emissions tests conducted on #18 Coke Oven Battery Combustion Stack.

By measuring and reporting the weight of material collected in the impingers and connecting glassware downstream of the sample filter(s), Bethlehem Steel Corporation does not consent to include such sample weights in any determination of compliance with emission limitations.

Due to the results of these tests and the limited data available concerning coke oven combustion stack emissions, we feel that additional testing is warranted. We would appreciate your comments and the comments of the PaDER Technical Services and Monitoring Division in regard to this matter.

Very truly yours,

John T. Dunn

John T. Dunn, P.E.
Superintendent
Environmental Control Department

GEE/lmp
attachment

cc w/attach: M. S. Malin
B. DeHaven
R. P. Frye, Esq.

Particulate emission tests were conducted at the #18 coke oven battery waste heat stack as specified in the Coke Oven Emission Abatement Plan currently being negotiated. The tests were conducted in a manner consistent with the requirements of 25 Pa. Code Chapter 139 in order to demonstrate compliance with 25 Pa. Code § 123.13(c) (i.e., 0.04 gr/scfd).

The first test was conducted on June 27, 1978 and was observed by J. Nazzaro, PaDER Technical Services, Harrisburg, PA. R. J. Clark, PaDER, District Air Pollution Control Engineer, Ebensburg, PA, recorded battery operating data and A. Majers, PaDER, Air Pollution Control Engineer, Ebensburg, PA, recorded stack opacity for the duration of the test.

When weighing the filter subsequent to testing, it was discovered that the sample exhibited an extremely high degree of hygroscopicity. In fact, it was not possible, with standard procedures, to obtain a reliable sample weight due to the rapid weight gain while on the balance. The sample weight was ultimately obtained by methods as described in Sample Recovery and Laboratory Analysis. Using this method yielded a grain loading of 0.110 gr/scfd, as measured by the front half of the sampling train.

Due to the unusual nature of the sample, and since the grain loading was inconsistent with the characteristically low opacity, two additional tests were performed using a modified sampling train. An in-stack as well as an out-of-stack filter was utilized for these tests and grain loadings were determined to be 0.022 gr/scfd and 0.018 gr/scfd, as measured by the front half of the sampling train.

Process Description

#18 Coke Oven Battery is a single collector main, by-product battery, containing 77 slot-type ovens and having a rated capacity of 1230 net tons of coke per day. A process flow schematic is shown in Appendix B. Premixed high and low volatile coal is charged into the ovens and, under normal conditions, allowed to "coke" for approximately 18 hours. The ovens are indirectly fired with undesulfurized coke oven gas which exhausts by natural draft through the waste heat stack. The stack discharge is 11 feet in diameter and 250 feet above grade.

Operating Conditions

#18 Coke Oven Battery was operating at normal capacity during the emission testing period. The average coking times were 18 hr. 29 min., 18 hr. 7 min., and 18 hr. 7 min. during Test Nos. 1, 2, and 3 respectively. Additional operating data is presented in Appendix B.

Test Equipment and Procedure

Testing was conducted at sampling ports located 102' above grade. The inside diameter of the stack at the sampling location is 12'5-5/8". For Tests No. 1 and No. 3, six traverse points per diameter were sample for 10 minutes per point. The locations of the traverse points on each radius with respect to the inside stack wall are as follows:

Traverse Point	Location (inches)
1	6.6
2	21.8
3	44.3

Test No. 1 was performed in conformance with the requirements of Method 5 - Determination of Particulate Emissions from Stationary Sources, published in the Appendix to the Standards of Performance for New Stationary Sources, promulgated by the United States Environmental Protection Agency. The sampling equipment was manufactured by Glass Innovations, Inc. Calibration dates are as follows:

Dry Gas Meter	-	4/3/78
Orifice		4/3/78
Nozzle		4/19/78
Thermocouples		6/22/78

The pitot tube-sample probe assembly is constructed in conformance with the design specifications of EPA Method 2 and as such, was assigned a base line coefficient of 0.84.

Due to low velocities in the stack, velocity pressures for the preliminary traverse and the test were determined using a one inch manometer having 0.005 inch divisions. The sampling probe, consisting of a one-half inch stainless steel nozzle and a glass liner, was connected directly to the inlet of the filter holder.

Sampling train leak checks were performed prior to and immediately following sampling at each of the four test ports.

The initial leak check was conducted at a vacuum equal to 10" Hg. Subsequent leak checks were conducted at a vacuum higher than the maximum vacuum obtained during testing. During Test No. 1, the leak check performed upon concluding sampling at the third port indicated a leakage rate of 0.078 cfm. Prior

to sampling the fourth port the leak was found and corrected. An adjustment to the dry gas meter volume was made to compensate for the leak. All other leak checks were below the 0.02 cfm limit.

Test No. 2 was conducted solely to determine if sampling with an in-stack filter would provide an insight into the unusual nature of the sample. Therefore, sampling during Test No. 2 was conducted at only one sample point and using an in-stack and an out-of-stack filter. The results of this test indicated a grain loading much lower than that determined in Test No. 1. Therefore, a confirming third test was conducted.

The test equipment and procedure for Test No. 3 was identical to Test No. 1, except that an in-stack filter was also used. Due to pitot tube interference by the in-stack filter holder, velocity pressures were determined using an S-type pitot tube immediately prior to sampling at each port. Copies of all field data sheets are included in Appendix A.

The dry gas molecular weight was determined using an Orsat Analyzer. Three individual gas samples were obtained and analyzed. The average results of the analyses are 4.7% CO_2, 8.3% O_2, 0.0% CO, and 87.0% N_2.

Sample Recovery and Laboratory Analysis

Post-test clean-up and sample recovery were performed in accordance with the procedures specified in EPA Method 5 and Chapter 139 of the PaDER Rules and Regulations. The weights of material collected in each portion of the sampling train were

determined individually. Results of all analyses are presented in Appendix A.

The hygroscopic nature of the filter particulate necessitated a modification of the balance weighing chamber in order to obtain an accurate weight. One side door of the balance was removed and replaced with an acetate sheet having a slot large enough to allow a filter to be placed on the balance. Compressed air was dried by passing through two impingers containing silica gel and introduced into the weighing chamber to create a slightly positive pressure. Filter weights could thus be determined without experiencing the extremely rapid weight gains previously encountered. To further reduce moisture interferences, the filters from Tests No. 2 and No. 3 were oven dried at 105° C, transported to the balance in hot petri dishes and weighed immediately.

Discussion

Subsequent to performing Test No. 1, it was felt that additional testing was warranted based on the following:

1. The sample obtained exhibited an extremely high degree of hygroscopicity making it impossible to be accurately weighed using the same method as was used to obtain the pretest filter weight. (A sample weight was ultimately obtained using the methods as previously described in the Sample Recovery and Laboratory Analysis.)

2. It was theorized that the hygroscopicity may be caused by matter which exists as a gas at the stack temperature (approximately 600° F) but was condensing at the probe and filter box temperature (approximately 250° F) and therefore being deposited on the filter. In order to confirm this theory, Test No. 2 was conducted utilizing both an in-stack and an out-of-stack filter. It should be noted that the in-stack filter catch from Test No. 2 did not exhibit any degree of hygroscopicity, however, the out-of-stack filter exhibited the same hygroscopic nature as that found in Test No. 1.

3. It is realized that a firm relationship between grain loading and stack emission opacity has not been established, however, it was felt that the grain loading of 0.110 gr/scfd was not consistent with the characteristically low opacities of this stack.

4. Test No. 2 confirmed the theory that the hygroscopic material exists as a gas at the stack temperature. However, since the total grain loading of 0.022 gr/scfd was significantly lower than Test No. 1, a third test was conducted for comparison purposes.

Test No. 3 yielded a grain loading of 0.018 gr/scfd and was conducted in an identical manner as Test No. 1 except that an in-stack filter was added to the sampling train. At

this time an adequate explanation cannot be offered regarding the extreme differences obtained by sampling with the two methods. However, due to the extreme differences and the relatively small amount of data available, it is felt that the results of Test No. 1 should not be used for determining compliance with 25 Pa. Code Section 123.13(c).

It is recommended that an intensive program be initiated to conduct additional testing and analysis to further evaluate, both quantitatively and qualitatively, the emissions from #18 Coke Oven Battery Combustion Stack.

Tests Conducted By:

G. E. Eckstein
Air Quality Control Engineer

R. J. Holtz
Senior Air Quality Control Technician

J. F. Fyock
Air Quality Control Technician

R. R. Moskal
Air Quality Control Technician

APPENDIX A

Exhibit I-A	Summary of Test Results
Exhibit II-A	Orsat Analysis
Exhibit III-A	Velocity Traverse
Exhibit IV-A	Field Data Sheets, 6/27/78
Exhibit V-A	Field Data Sheets, 8/2/78
Exhibit VI-A	Field Data Sheets, 8/7/78
Exhibit VII-A	Laboratory Data Sheet, 6/27/78
Exhibit VIII-A	Laboratory Data Sheet, 8/2/78
Exhibit IX-A	Laboratory Data Sheet, 8/7/78
Exhibit X-A	Calculation Sheets, 6/27/78
Exhibit XI-A	Calculation Sheets, 8/2/78
Exhibit XII-A	Calculation Sheets, 8/7/78
Exhibit XIII-A	Stack Drawing

EXHIBIT I-A

Summary of Test Results

	Test #1	Test #2	Test #3
Concentration-Front Half (gr/scfd)	0.110	0.022	0.018
Emission Rate-Front Half (lb/hr)	50.9	10.2	8.0
Sample Volume (scfd)	66.298	65.587	64.718
Volumetric Flow Rate (scfmd)	53,980	55,430	50,330
Gas Temperature (°F)	595	538	566
Moisture Content (%)	17.8	12.9	17.0
Isokinetic (%)	97.4	93.8	102.0
Total Front Half Sample Wt. (g)	0.4731	0.0915	0.0773
In-Stack Filter Sample Wt. (g)	----	0.0313	0.0212
Out-Of-Stack Filter Sample Wt. (g)	0.4165	0.0267	0.0353
Total Back Half Sample Wt. (g)	0.0775	0.0499	0.0457
Back Half Sulfates (g)	0.0476	----	----
Total Sample Wt. (g)	0.5506	0.1414	0.1230

EXHIBIT II-A

Orsat Analysis

	Run #1	Run #2	Run #3	Average
CO_2	5.2	4.4	4.4	4.7
O_2	13.8	12.4	12.8	13.0
CO	13.9	12.4	12.8	13.0

% CO_2 = 4.7

% O_2 = 8.3

% CO = 0.0

% N_2 = 87.0

$$Md = 0.44(4.7) + 0.32(8.3) + 0.28(87.0) = 29.08$$

EXHIBIT III A

PLANT: COKE - #18 BATTERY WASTE HEAT STACK
DATE 6-24-78 RUN NO.
STACK DIAMETER OR DIMENSIONS, m(in.) 149.625"
BAROMETRIC PRESSURE, mm Hg (in. Hg)
CROSS SECTIONAL AREA, $m^2(ft^2)$ 122.1 ft^2
OPERATORS RJH, JFF, RRM
PITOT TUBE I.D. NO. 10' 6II
AVG. COEFFICIENT, C_p = 0.84
LAST DATE CALIBRATED

SCHEMATIC OF STACK CROSS SECTION

	Traverse Pt. No.	Vel. Hd., Δp mm (in.) H_2O	Stack Temperature t_s, °C (°F)	Stack Temperature T_s, °K (°R)	P_g mm Hg (in. Hg)	$\sqrt{\Delta p}$
SOUTH PORT	3	.046	605	1065		.214
	2	.051	604	1064		.226
	1	.042	595	1055		.205
WEST PORT	3	.045	590	1050		.212
	2	.045	580	1040		.212
	1	.045	578	1038		.212
NORTH PORT	3	.058	575	1035		.241
	2	.060	588	1048		.245
	1	.048	565	1025		.219
EAST PORT	3	.055	603	1063		.235
	2	.050	615	1075		.224
	1	.038	603	1063		.195
			Average	1052		.220

Figure 2-5. Velocity traverse data.

EXHIBIT IV-A

Location: COKE PLANT
Operation: #1 & BATTERY STACK
Sampling Meth.: EPA #5
Test #: 1
Filter Type / #: GF / A

Bar. Press.:
Amb. Temp.:
Time: 1000
Total Cond.:
Meter C.F.: .997
Operator: JEF, KJH, GEE, RRM

POINT	TIME	METER READING Ft.³ ST. 465.377	PRESSURE "H_2O PITOT	PRESSURE "H_2O ORIF.	SYS. VAC. "Hg.	TEMPERATURES DEG. F STACK	SAMPLE UNIT	ICE BATH EXIT	PROBE	GAS METER INLET	GAS METER OUTLET	
3	5	468.46	.052	1.45	4.2	598	246	63	260	84	77	Pre Le
	10	471.59	.052	1.45	4.0	604	250	50	246	95	77	
2	15	474.68	.050	1.40	3.4	608	245	56	248	102	82	
	20	477.75	.050	1.40	3.4	614	252	57	250	104	85	
1	25	480.48	.036	1.00	2.6	596	246	56	254	110	88	
	30	483.258	.038	1.06	2.6	596	253	59	256	113	92	Post Le
		17.881										
										END	1040	
		483.393										
3	5	486.32	.052	1.45	3.1	560	225	50	223	101	88	Pre Lea
	10	489.46	.052	1.45	3.4	599	226	47	245	103	89	
2	15	492.78	.058	1.62	3.6	602	245	61	240	111	95	
	20	496.29	.058	1.62	4.9	600	246	62	225	110	94	
1	25	499.41	.053	1.48	3.5	597	229	55	243	112	90	
	30	502.591	.053	1.48	3.5	589	239	58	235	110	90	Post Leak
		19.198										

Post Leak <.02

TEST DATA FOR: Moisture
NO_x
SO_2

CONTAINER NO.
TIME
TEMP.: Cont.
Amb.

IMP. VOL. 1 2 3 4

TOTAL VOL. ml.

Location: COKE PLANT
Operation: #1/8 BATTERY STACK
Sampling Meth.: EPA #5
Test #: 1
Filter Type / #: GF / A

Amb. Temp.:
Time: 1235 - 1425
Total Cond.:
Meter C.F.: .997
Operator: JFF RJH, RCM, GEC

STATIC = -.85

POINT	TIME	METER READING Ft.³ ST 502.762	PRESSURE "H2O PITOT	PRESSURE "H2O ORIF.	SYS. VAC. "Hg.	TEMPERATURES DEG. F. STACK	SAMPLE UNIT	ICE BATH EXIT	PROBE	GAS METER INLET	GAS METER OUTLET	
3	5	505.75	.048	1.35	3.1	567	225	52	242	100	88	Pre Leak
	10	508.82	.050	1.40	3.3	598	258	58	268	101	88	
2	15	511.99	.052	1.45	3.5	608	269	57	232	103	90	
	20	515.24	.054	1.50	3.6	616	254	61	236	105	94	
1	25	518.21	.046	1.29	3.1	600	248	67	236	106	96	
	30	521.069	.043	1.20	3.0	602	236	66	234	101	89	Post Leak .078
		16.567 corrected										
Start	1353	521.598										
3	5	524.87	.050	1.40	3.4	607	252	65	229	84	83	Pre leak <.0
	10	527.92	.050	1.40	3.2	626	235	66	235	96	78	
2	15	531.07	.052	1.42	3.5	578	228	61	230	97	83	
	20	534.22	.052	1.42	3.5	575	226	62	229	95	84	
1	25	537.27	.048	1.35	3.5	577	265	62	266	94	83	
	30	540.334	.048	1.35	3.5	572	260	64	225	89	85	Post Leak
		18.736	.223	1.39		595				94		

TEST DATA FOR; Moisture
NO_x 72.382
SO_2

IMP. VOL. 1 ____ 2 ____ 3 ____ 4 ____

TOTAL VOL. ____ ml.

CONTAINER NO. ____
TIME ____
TEMP.; Cont. ____
Amb. ____

EXHIBIT V-A

Location [illegible]
Operation [illegible]
Sampling Meth. EPA#5 w/ [illegible]
Test # 2
Filter Type / # CF / A

Bar. Press. [illegible]
Amb. Temp. [illegible]
Time 345PM
Total Cond. [illegible]
Meter C.F. 1.006
Operator RTH, JEF

STATIC - .80

POINT	TIME	METER READING Ft.3 ST. 666.660	PRESSURE "H_2O PITOT	PRESSURE "H_2O ORIF.	SYS. VAC. "Hg.	TEMPERATURES DEG. F. STACK	SAMPLE UNIT	ICE BATH EXIT	PROBE	GAS METER INLET	GAS METER OUTLET
	10	672.	.045	1.26	4.4	520	249	56	253	78	63
	20	678.47			4.5	536	265	55	246	90	68
	30	684.37			4.5	540	244	52	252	98	86
	40	690.26			4.6	535	234	55	245	105	88
	50	696.29			4.6	538	227	68	228	111	92
	60	702.29			4.7	530	225	50	268	99	93
	70	708.33			4.6	550	268	52	253	102	96
	80	714.34			4.7	542	260	54	256	106	96
	90	720.34			4.7	548	256	54	250	106	98
	100	726.39			4.7	538	253	56	248	112	105
	110	732.24			5.0	550	230	68	234	119	106
	120	737.938			5.5	524	231	66	261	122	107
		71.278	.212			538					

TEST DATA FOR; Moisture
NO_x
SO_2

CONTAINER NO. _____
TIME _____
TEMP.; Cont. _____
Amb. _____

IMP. VOL. 1 _____ 2 _____ 3 _____ 4 _____

TOTAL VOL. _____ ml.

LEAK ✓ .009 cfm

EXHIBIT VI-A

Date [illegible]
Location #13 [illegible]
Operation //
Sampling Meth. EPA#5 w/ [illegible]
Test //
Filter Type / # /

Bar. Press. 30.11 - 1.39 - 28.72
Amb. Temp.
Time 1115
Total Cond.
Meter C.F.
Operator JFF, RJH

SHEET 1 OF 2

STATIC - .91

POINT	TIME	METER READING Ft.3 ST.738.559	PRESSURE "H_2O PITOT	PRESSURE "H_2O ORIF.	SYS. VAC. "Hg.	TEMPERATURES DEG. F. STACK	SAMPLE UNIT	ICE BATH EXIT	PROBE	GAS METER INLET	GAS METER OUTLET
3	5	741.36	.043	1.20	4.6	542	240	58	238	79	67
2	10	744.22			4.9	558	242	53	240	81	67
2	15	747.21	.050	1.40	5.2	596	246	52	236	84	74
1 17.797	20	750.27			5.8	598	238	54	236	88	76
	25	753.32	.045	1.26	5.9	594	243	56	248	89	79
	30	756.356			5.9	542	336	56	248	92	80
	Start →	756.408									
3	5	759.23	.042	1.17	5.2	526	235	58	245	84	78
	10	762.82			5.5	551	248	62	260	89	78
2	15	764.91	.040	1.11	6.0	584	265	63	248	95	84
	20	767.65			6.1	586	263	55	261	99	84
1 17.060	25	770.62	.036	1.01	6.5	592	255	58	245	92	81
	30	773.468			6.2	542	254	59	271	96	81

TEST DATA FOR; Moisture
NO_x
SO_2

CONTAINER NO.
TIME
TEMP.; Cont.
Amb.

IMP. VOL. 1 ____ 2 ____ 3 ____ 4 ____
TOTAL VOL. ____ ml.

West LEAK CHECK 0.0 cfm
South " " 0.0 cfm

Location: Cons Plant
Operation: ATK WHS
Sampling Meth.: EPA 5 w/10 stack Lang
Test #: 3
Filter Type / #: GF / A
Amb. Temp.:
Time: 1.55
Total Cond.:
Meter C.F.: 1.001
Operator: RT H, JEF, RCA

Sheet 2 of 2

POINT	TIME	METER READING Ft.³ ST. 773.520	PRESSURE "H2O PITOT	PRESSURE "H2O ORIF.	SYS. VAC. "Hg.	TEMPERATURES DEG. F. STACK	SAMPLE UNIT	ICE BATH EXIT	PROBE	GAS METER INLET	GAS METER OUTLET
North Port 3	5.	776.40	.040	1.11	6.5	602	232	59	238	78	74
	10	779.20			6.5	612	260	54	255	79	74
2	15	782.03	.040	1.11	6.5	598	258	60	262	90	78
	20	784.91			6.6	595	240	58	245	98	84
1	25	787.77	.029	.81	6.5	550	235	58	243	100	85
	30	790.453			6.5	520	241	60	248	102	86
	stop	790.5835									
East Port 3	5	793.43	.041	1.14	8.5	540	270	60	243	85	77
	10	796.65			8.0	574	243	57	268	89	76
2	15	799.018	.039	1.09	8.9	577	240	66	254	96	82
	20	802.09			9.8	578	234	63	251	97	85
1	25	804.80	.030	.84	10.0	560	248	60	241	96	88
	30	807.468			10.7	480	232	61	243	95	84
		68.723	.198	1.10		566				85	

TEST DATA FOR; Moisture
NO_x
SO_2

CONTAINER NO.
TIME
TEMP.; Cont.
Amb.

IMP. VOL. 1 2 3 4

TOTAL VOL. ml.

North Leak ✓ <.02
East Leak ✓ <.02

EXHIBIT VII-A

Test No. 1

Location #18 Battery W.H.S.

Date 6-27-78

LABORATORY DATA SHEET

I. Filter Particulate

Final Filter Weight	1.2906	g
Initial Filter Weight	0.8741	g
Weight of Particulate collected	0.4165	g

II. Dry Particulate

	Acetone		Distilled Water	
Volume of Washings	190	ml	350	ml
Weight of Container and Particulate	53.1500	g	84.3477	g
Weight of Container	53.1370	g	84.3008	g
Weight of Particulate	0.0130	g	0.0469	g

III. Condenser Solids

Volume of Washings	78	ml	290	ml
Volume of Condensate and Water Washings			774	ml
Weight of Container and Condenser Solids	52.5361	g	85.4718	g
Weight of Container	52.5319	g	85.4493	g
Weight of Condenser Solids	0.0042	g	0.0225	g/ 300 ml
Weight of Insoluble Condenser Solids			0.0190	g
Total Weight of Solids in Condensate and Water Washings			0.0771	g

IV. Correction Blanks

Volume of Blank	200	ml	200	ml
Weight of Container and Residue	54.41028	g	50.07237	g
Weight of Container	54.40930	g	50.07094	g
Weight of Residue	0.00098	g	0.00143	g
Correction	0.0005	g/100 ml	0.0007	g/100 ml

V. Summary of Results

Corrected Weight of Dry Particulate	0.0121	g	0.0445	g
Corrected Weight of Condenser Solids	0.0038	g	0.0737	g
Weight of Filter Particulate			0.4165	g

Total Weight of Material Collected 0.5506 g

VI. Volume of Condensate Collected

	Initial Volume		Final Volume		Increase	
Impinger #1	100	ml	337	ml	237	ml
Impinger #2	100	ml	142	ml	42	ml
Impinger #3	0	ml	5	ml	5	ml
Silica Gel	200.0	g	219.5	g	19.5	g

Volume Collected 303.5 ml

LABORATORY DATA SHEET

Location #18 Battery W.H.S.

Date 8-2-78

I. FILTER PARTICULATE

	In Stack		Out of Stack	
Final Filter Weight	0.1979	g	0.9717	g
Initial Filter Weight	0.1666	g	0.9450	g
Weight of Particulate Collected	0.0313	g	0.0267	g

II. DRY PARTICULATE

	Nozzle		Probe	
Volume of Acetone Washings	28	ml	368	ml
Weight of Beaker and Dry Particulate	80.9651	g	80.9990	g
Weight of Beaker	80.9628	g	80.9651	g
Weight of Dry Particulate	0.0023	g	0.0339	g

III. CONDENSER SOLIDS

Volume of Condensate and Washings	516	ml
Weight of Beaker and Condenser Solids	73.7880	g
Weight of Beaker	73.7582	g
Weight of Condenser Solids	0.0298	g/300ml
	0.0513	g Total

V. CORRECTION BLANKS

Acetone Blank	0.00067	g/100 ml
Distilled Water Blank	0.00027	g/100 ml

SUMMARY OF RESULTS

Weight of Filter Particulate	0.0580	g
Corrected Weight of Dry Particulate	0.0335	g
Corrected Weight of Condenser Solids	0.0499	g
Total Corrected Weight of Material Collected	0.1414	g

VOLUME OF CONDENSATE COLLECTED

	Initial Volume (ml)		Final Volume (ml)		Increase (ml)	
Impinger #1	100		270		170	
Impinger #2	100		119		19	
Impinger #3	0		2		2	
Silica Gel	213.4	g	226.7	g	13.3	g
Total Volume Collected			204.3	ml		

LABORATORY DATA SHEET

Location #18 Battery W.H.S.

Date 8-7-78

I. FILTER PARTICULATE

	In Stack		Out of Stack	
Final Filter Weight	0.1754	g	0.5174	g
Initial Filter Weight	0.1542	g	0.4821	g
Weight of Particulate Collected	0.0212	g	0.0353	g

II. DRY PARTICULATE

	Nozzle		Probe	
Volume of Acetone Washings	31	ml	397	ml
Weight of Beaker and Dry Particulate	53.0606	g	81.2472	g
Weight of Beaker	53.0588	g	81.2253	g
Weight of Dry Particulate	0.0018	g	0.0219	g

III. CONDENSER SOLIDS

Volume of Condensate and Washings	776	ml
Weight of Beaker and Condenser Solids	89.2411	g
Weight of Beaker	89.2229	g
Weight of Condenser Solids	0.0182	g/300ml
	0.0471	g Total

IV. CORRECTION BLANKS

Acetone Blank	0.00067	g/100 ml
Distilled Water Blank	0.00027	g/100 ml

SUMMARY OF RESULTS

Weight of Filter Particulate	0.0565	g
Corrected Weight of Dry Particulate	0.0208	g
Corrected Weight of Condenser Solids	0.0457	g
Total Corrected Weight of Material Collected	0.1230	g

I. VOLUME OF CONDENSATE COLLECTED

	Initial Volume (ml)		Final Volume (ml)		Increase (ml)	
Impinger #1	100		330		230	
Impinger #2	100		129		29	
Impinger #3	0		5		5	
Silica Gel	200.0	g	216.5	g	16.5	g

Total Collected 280.5 ml

EXHIBIT X-A

EPA METHOD NO. 5
CALCULATION SHEETS

Test No.: 1

Location: #18 Batt. Waste Heat Stack

Test Date: 6-27-78

Calculated By: JFF

1) Volume of Water Collected:

$$Vwc_{std} = (Vfc - Vic)\left(\frac{\rho H_2O}{MH_2O}\right)\left(\frac{T_{std}}{P_{std}}\right) R$$

$$Vwc_{std} = \left(0.0474\ \frac{ft^3}{ml}\right)(Vfc - Vic) = (0.0474)(703.5 - 400)$$

Vwc_{std} = 14.386 scf

2) Volume of Air Metered:

$$Vm_{std} = Vm\left(\frac{T_{std}}{Tm}\right)\left(\frac{P_{bar} + \frac{\overline{\Delta H}}{13.6}}{P_{std}}\right)\left(\text{Meter Correction Factor}\right)$$

$$Vm_{std} = (72.382)\left(\frac{530°}{554}\right)\left(\frac{28.63 + \frac{1.39}{13.6}}{29.92"\ Hg}\right)(.997)$$

Vm_{std} = 66.298 scf dry

3) Stack Gas Moisture Content:

$$Bwo = \frac{Vwc_{std}}{Vm_{std} + Vwc_{std}} = \frac{14.386}{66.298 + 14.386} = .178$$

$$\% \ H_2O = Bwo \times 100$$

$$\% \ H_2O = \underline{17.8 \ \%}$$

4) Molecular Weight of Dry Gas:

$$Md = \left(\% \ CO_2 \times \frac{44}{100}\right) + \left(\% \ O_2 \times \frac{32}{100}\right) + \left(\% \ CO \times \frac{28}{100}\right) + \left(\% \ N_2 \times \frac{28}{100}\right)$$

$$Md = \left(4.7 \times .44\right) + \left(8.3 \times .32\right) + \left(0 \times .28\right) + \left(87.0 \times .28\right)$$

$$Md = \quad + \quad + \quad +$$

$$Md = \underline{29.08}$$

8.3

.24(27) - 8.3 +

5) Molecular Weight of Stack Gases:

$$Ms = Md\left(1 - Bwo\right) + 18\left(Bwo\right) = \left(29.08\right)\left(.822\right) + 18\left(.178\right)$$

$$Ms = 23.904 + 3.204$$

$$Ms = \underline{27.11}$$

6) Velocity of Exit Gases: (ACTUAL)

$$V_s = Kp \ Cp \sqrt{\frac{Ts}{Ps \ Ms}} \left(\sqrt{\Delta P}\right)_{avg}$$

$$V_s = \left[\left(85.48 \frac{ft}{sec}\right)\left(.84 \right)\right]\sqrt{\frac{(1055)}{(28.57)(27.11)}}\left(.223 \right)$$

$$V_s = \left(71.803 \right)\left(1.167 \right)\left(.223 \right)$$

$$V_s = \underline{18.686} \text{ afps}$$

Where: $Ps = Pbar \pm \frac{Ps'}{13.6} = 28.63 \pm \frac{.85}{13.6" Hg}$

$$Ps = \underline{28.57} \text{ " Hg}$$

7) Total Flow of Stack Gases:

ACTUAL:

$$Qs = As V_s \times 60 = \left(122.1 \right)\left(18.686\right) \times 60 = \underline{136,900} \text{ acfm}$$

STANDARD:

$$Qs_{std} = Qs \left(\frac{Ps}{P_{std}} \right) \left(\frac{T_{std}}{Ts} \right)\left(1 - Bwo \right)$$

$$Qs_{std} = \left(136900 \right)\left(\frac{28.57}{29.92"Hg}\right) \left(\frac{530°}{1055} \right)\left(.822 \right)$$

$$Qs_{std} = \underline{53980} \text{ scfm dry}$$

7b) Velocity of Exit Gases: (STANDARD)

$$V_{s_{std}} = Qs_{std} / As = \left(53980 \right) / \left(122.1 \right)$$

$$V_{s_{std}} = \underline{442.1} \text{ sfpm}$$

8) Particulate Concentration:

$$Cs = \left(\frac{Mn}{Vm_{std}}\right)\left(15.43\ \frac{grains}{gram}\right)$$

$$Cs = \left(\frac{.5506}{66.298}\right) \times 15.43 = \left(.0083\right) \times 15.43$$

$$Cs = \underline{\quad .128 \quad}\ gr/scf\ dry$$

9) Pollutant Mass Rate: (pmr)

$$pmr = \frac{(Mn)(Qs_{std}) \times 60}{Vm_{std} \times 454\ \frac{grams}{lb.}}$$

$$pmr = \frac{\left(.5506\right)\left(53980\right) \times 60}{\left(66.298\right) \times 454} = \frac{\left(1783300\right)}{\left(30099\right)}$$

$$pmr = \underline{\quad 59.2 \quad}\ lbs/hr$$

10) Percent Isokinetic:

$$\%\ isokinetic = Vm_{std} \times 100 \Big/ An\ \theta \sqrt{s_{std}}$$

$$\%\ isokinetic = \left(66.298\right) \times 100 \Big/ \left(.001283\right)\left(120\right)\left(442.1\right)$$

$$\%\ isokinetic = \underline{\quad 97.4 \quad \%}$$

EXHIBIT XI-A

EPA METHOD NO. 5
CALCULATION SHEETS

Test No.: 2

Location: #18 W.H.S.

Test Date: 8-2-78

Calculated By: JFF

1) Volume of Water Collected:

$$Vwc_{std} = (Vfc - Vic)\left(\frac{\rho H_2O}{MH_2O}\right)\left(\frac{T_{std}}{P_{std}}\right) R$$

$$Vwc_{std} = \left(0.0474\ \frac{ft^3}{ml}\right)\left(Vfc - Vic\right) = \left(0.0474\right)\left(617.7 - 413.4\right)$$

Vwc_{std} = 9.684 scf

2) Volume of Air Metered:

$$Vm_{std} = Vm\left(\frac{T_{std}}{Tm}\right)\left(\frac{P_{bar} + \frac{\overline{\Delta H}}{13.6}}{P_{std}}\right)\left(\text{Meter Correction Factor}\right)$$

$$Vm_{std} = \left(71.278\right)\left(\frac{530°}{558}\right)\left(\frac{28.72 + \frac{1.26}{13.6}}{29.92"\ Hg}\right)\left(1.006\right)$$

Vm_{std} = 65.587 scf dry

3) Stack Gas Moisture Content:

$$Bwo = \frac{Vwc_{std}}{Vm_{std} + Vwc_{std}} = \frac{9.684}{65.587 + 9.684} = .129$$

$$\% \ H_2O = Bwo \times 100$$

$$\% \ H_2O = \underline{12.9 \ \%}$$

4) Molecular Weight of Dry Gas:

$$Md = \left(\% \ CO_2 \times \frac{44}{100}\right) + \left(\% \ O_2 \times \frac{32}{100}\right) + \left(\% \ CO \times \frac{28}{100}\right) + \left(\% \ N_2 \times \frac{28}{100}\right)$$

$$Md = \left(4.7 \times .44\right) + \left(8.3 \times .32\right) + \left(0 \times .28\right) + \left(87.0 \times .28\right)$$

$$Md = \quad + \quad + \quad +$$

$$Md = \underline{29.08}$$

5) Molecular Weight of Stack Gases:

$$Ms = Md\left(1 - Bwo\right) + 18\left(Bwo\right) = \left(29.08\right)\left(.871\right) + 18\left(.129\right)$$

$$Ms = \quad +$$

$$Ms = \underline{27.65}$$

6) Velocity of Exit Gases: (ACTUAL)

$$V_s = Kp \ Cp \sqrt{\frac{Ts}{Ps \ Ms}} \left(\sqrt{\Delta P}\right)_{avg}$$

$$V_s = \left[\left(85.48 \frac{ft}{sec}\right)\left(.84 \right)\right]\sqrt{\frac{(998)}{(28.66)(27.65)}}\left(.212 \right)$$

$$V_s = \left(71.803 \right)\left(1.122 \right)\left(.212 \right)$$

$$V_s = \underline{\quad 17.08 \quad} \text{ afps}$$

Where: $Ps = Pbar \pm \frac{Ps'}{13.6} = 28.72 \pm \frac{.8}{13.6" Hg}$

$$Ps = \underline{\quad 28.66 \quad} \text{ " Hg}$$

7) <u>Total Flow of Stack Gases</u>:

<u>ACTUAL</u>:

$$Qs = As V_s \times 60 = \left(122.1 \right)\left(17.08 \right) \times 60 = \underline{\quad 125100 \quad} \text{ acfm}$$

<u>STANDARD</u>:

$$Qs_{std} = Qs \left(\frac{Ps}{P_{std}} \right) \left(\frac{T_{std}}{Ts} \right)\left(1 - Bwo \right)$$

$$Qs_{std} = \left(125100 \right)\left(\frac{28.66}{29.92"Hg}\right) \left(\frac{530°}{998} \right)\left(.871 \right)$$

$$Qs_{std} = \underline{\quad 55430 \quad} \text{ scfm dry}$$

7b) <u>Velocity of Exit Gases</u>: (<u>STANDARD</u>)

$$V_{s_{std}} = Qs_{std} / As = \left(55430 \right) / \left(122.1 \right)$$

$$V_{s_{std}} = \underline{\quad 454.0 \quad} \text{ sfpm}$$

8) Particulate Concentration:

$$Cs = \left(\frac{Mn}{Vm_{std}}\right)\left(15.43\ \frac{grains}{gram}\right)$$

$$Cs = \left(\frac{.1414}{65.587}\right) \times 15.43 = \left(.002\right) \times 15.43$$

$$Cs = \underline{\quad .033 \quad}\ gr/scf\ dry$$

9) Pollutant Mass Rate: (pmr)

$$pmr = \frac{(Mn)(Qs_{std}) \times 60}{Vm_{std} \times 454\ \frac{grams}{lb.}}$$

$$pmr = \frac{\left(.1414\right)\left(55430\right) \times 60}{\left(65.587\right) \times 454} = \frac{\left(470268.12\right)}{\left(29776.498\right)}$$

$$pmr = \underline{\quad 15.8 \quad}\ lbs/hr$$

10) Percent Isokinetic:

$$\%\ isokinetic = Vm_{std} \times 100 \Big/ An\ \theta \sqrt{s_{std}}$$

$$\%\ isokinetic = \left(65.587\right) \times 100 \Big/ \left(.001283\right)\left(120\right)\left(454.0\right)$$

$$\%\ isokinetic = \underline{\quad 93.8\ \% \quad}$$

EXHIBIT XII-A

EPA METHOD NO. 5
CALCULATION SHEETS

Test No.:	3
Location:	#18 Battery W.H.S.
Test Date:	8-7-78
Calculated By:	JFF

1) Volume of Water Collected:

$$Vwc_{std} = (Vfc - Vic)\left(\frac{\rho H_2O}{MH_2O}\right)\left(\frac{T_{std}}{P_{std}}\right) R$$

$$Vwc_{std} = \left(0.0474\ \frac{ft^3}{ml}\right)\left(Vfc - Vic\right) = \left(0.0474\right)\left(680.5 - 400.0\right)$$

Vwc_{std} = 13.296 scf

2) Volume of Air Metered:

$$Vm_{std} = Vm\left(\frac{T_{std}}{Tm}\right)\left(\frac{P_{bar} + \frac{\overline{\Delta H}}{13.6}}{P_{std}}\right)\left(\text{Meter Correction Factor}\right)$$

$$Vm_{std} = \left(68.723\right)\left(\frac{530°}{545}\right)\left(\frac{28.72 + \frac{1.10}{13.6}}{29.92''\ Hg}\right)\left(1.006\right)$$

Vm_{std} = 64.718 scf dry

3) Stack Gas Moisture Content:

$$Bwo = \frac{Vwc_{std}}{Vm_{std} + Vwc_{std}} = \frac{13.296}{64.718 + 13.296} = .170$$

$$\% \ H_2O = Bwo \times 100$$

$$\% \ H_2O = \underline{17.0 \ \%}$$

4) Molecular Weight of Dry Gas:

$$Md = \left(\% \ CO_2 \times \frac{44}{100}\right) + \left(\% \ O_2 \times \frac{32}{100}\right) + \left(\% \ CO \times \frac{28}{100}\right) + \left(\% \ N_2 \times \frac{28}{100}\right)$$

$$Md = \left(4.7 \times .44\right) + \left(8.3 \times .32\right) + \left(0 \times .28\right) + \left(87.0 \times .28\right)$$

$$Md = \quad + \quad + \quad +$$

$$Md = \underline{29.08}$$

5) Molecular Weight of Stack Gases:

$$Ms = Md\left(1 - Bwo\right) + 18\left(Bwo\right) = \left(2908\right)\left(.83\right) + 18\left(.170\right)$$

$$Ms = \quad +$$

$$Ms = \underline{27.20}$$

6) Velocity of Exit Gases: (ACTUAL)

$$V_s = Kp \ Cp \sqrt{\frac{Ts}{Ps \ Ms}} \left(\sqrt{\Delta P}\right)_{avg}$$

$$V_s = \left[\left(85.48 \frac{ft}{sec}\right)\left(.862 \right)\right]\sqrt{\frac{(1026)}{(28.65)(27.2)}}\left(.198 \right)$$

$$V_s = \left(73.684 \right)\left(1.147 \right)\left(0.198 \right)$$

$$V_s = \underline{\quad 16.740 \quad} \text{ afps}$$

Where: $Ps = Pbar \pm \frac{Ps'}{13.6} = 28.72 \pm \frac{.91}{13.6" Hg}$

$$Ps = \underline{\quad 28.65 \quad} \text{ " Hg}$$

7) <u>Total Flow of Stack Gases:</u>

<u>ACTUAL:</u>

$$Qs = As V_s \times 60 = \left(122.1 \right)\left(16.74 \right) \times 60 = \underline{\quad 122,600 \quad} \text{ acfm}$$

<u>STANDARD:</u>

$$Qs_{std} = Qs \left(\frac{Ps}{P_{std}} \right) \left(\frac{T_{std}}{Ts} \right)\left(1 - Bwo \right)$$

$$Qs_{std} = \left(122,600 \right)\left(\frac{28.65}{29.92"Hg} \right) \left(\frac{530°}{1026} \right)\left(.83 \right)$$

$$Qs_{std} = \underline{\quad 50,330 \quad} \text{ scfm dry}$$

7b) <u>Velocity of Exit Gases:</u> (<u>STANDARD</u>)

$$V_{s_{std}} = Qs_{std} / As = \left(50,330 \right) / \left(122.1 \right)$$

$$V_{s_{std}} = \underline{\quad 412.2 \quad} \text{ sfpm}$$

8) Particulate Concentration:

$$Cs = \left(\frac{Mn}{Vm_{std}}\right)\left(15.43\ \frac{grains}{gram}\right)$$

$$Cs = \left(\frac{.123}{64.718}\right) \times 15.43 = \left(.0019\right) \times 15.43$$

$$Cs = \underline{\quad .029 \quad}\ gr/scf\ dry$$

9) Pollutant Mass Rate: (pmr)

$$pmr = \frac{(Mn)(Qs_{std}) \times 60}{Vm_{std} \times 454\ \frac{grams}{lb.}}$$

$$pmr = \frac{\left(.123\right)\left(50,330\right) \times 60}{\left(64.718\right) \times 454} = \frac{\left(371435.400\right)}{\left(29381.972\right)}$$

$$pmr = \underline{\quad 12.6 \quad}\ lbs/hr$$

10) Percent Isokinetic:

$$\%\ isokinetic = Vm_{std} \times 100 \Big/ An\ \theta \sqrt{s_{std}}$$

$$\%\ isokinetic = \left(64.718\right) \times 100 \Big/ \left(.001283\right)\left(120\right)\left(412.2\right)$$

$$\%\ isokinetic = \underline{\quad 102.0\ \% \quad}$$

EXHIBIT I-B

Coking Record (6-27-78)

Oven #	Time Pushed	Time Charged	Coking Hr.	Coking Min.
44	914	1000	17	35
54	1014	1042	18	24
64	1038	1051	18	36
74	1049	1104	18	36
84	1101	1119	18	38
6	1115	1136	18	41
16	1128	1148	18	53
26	1145	1203	18	50
36	1200	1240	18	13
46	1237	1251	18	40
56	1248	1302	18	41
66	1259	1311	18	40
76	1308	1323	18	36
8	1319	1334	18	37
18	1331	1346	18	34
28	1343	1357	18	31
38	1354	1407	18	32
48	1404	1416	18	30
58	1413	1424	18	31
68	1421	1433	18	29

APPENDIX B

Exhibit I-B	Coking Record, 6/27/78
Exhibit II-B	Daily Production Worksheet, 6/27/78
Exhibit III-B	Collecting Main Pressure Chart (East End), 6/27/78
Exhibit IV-B	Collecting Main Pressure Chart (West End), 6/27/78
Exhibit V-B	Coke Oven Gas Consumption Chart, 6/27/78
Exhibit VI-B	Coking Record, 8/2/78
Exhibit VII-B	Daily Production Worksheet, 8/2/78
Exhibit VIII-B	Collecting Main Pressure Chart (East End), 8/2/78
Exhibit XI-B	Collecting Main Pressure Chart (West End), 8/2/78
Exhibit X-B	Coke Oven Gas Consumption Chart, 8/2/78
Exhibit XI-B	Coking Record, 8/7/78
Exhibit XII-B	Daily Production Worksheet, 8/7/78
Exhibit XIII-B	Collecting Main Pressure Chart (East End), 8/7/78
Exhibit XIV-B	Collecting Main Pressure Chart (West End), 8/7/78
Exhibit XV-B	Coke Oven Gas Consumption Chart, 8/7/78
Exhibit XVI-B	Process Flow Schematic

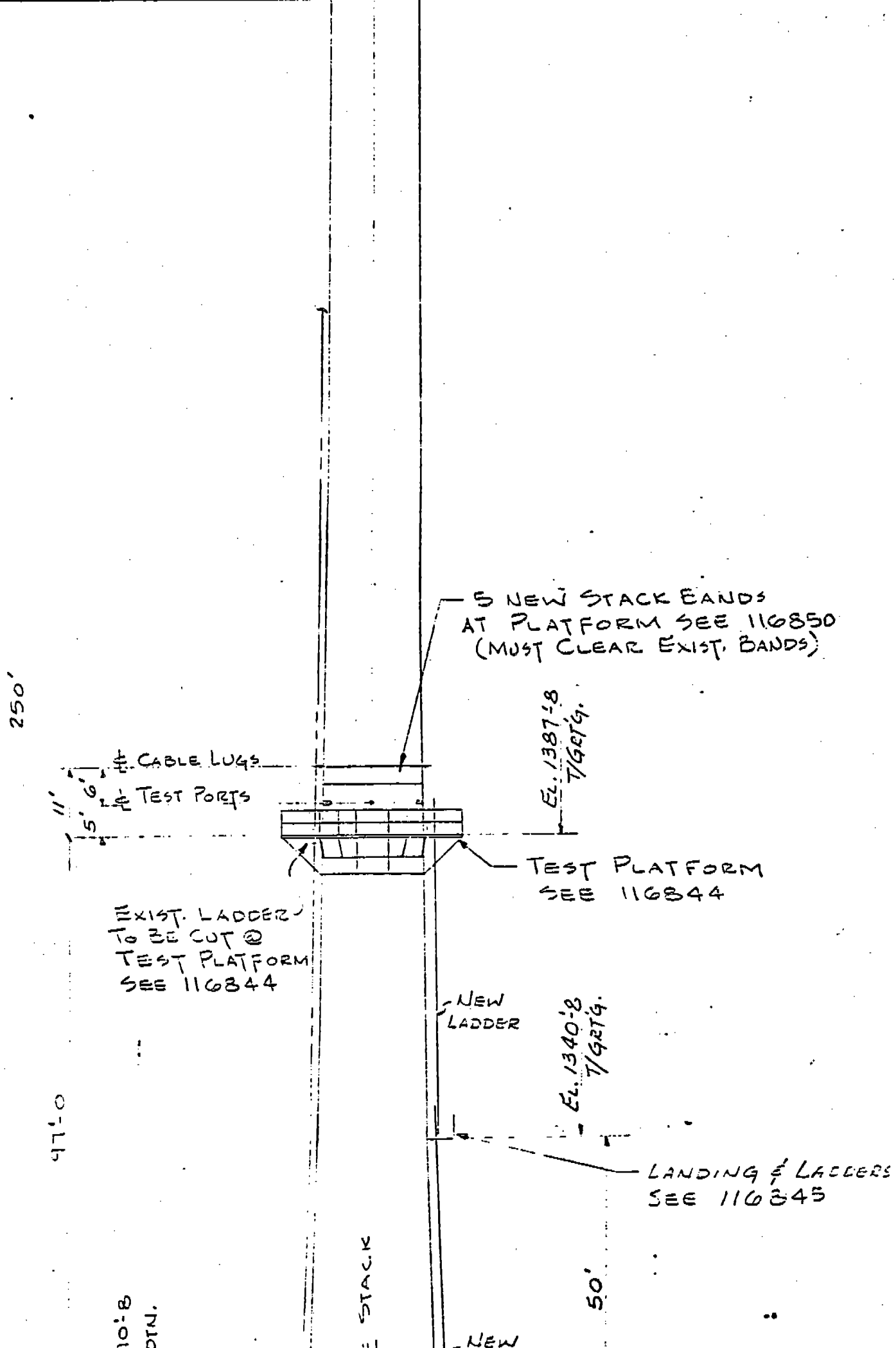
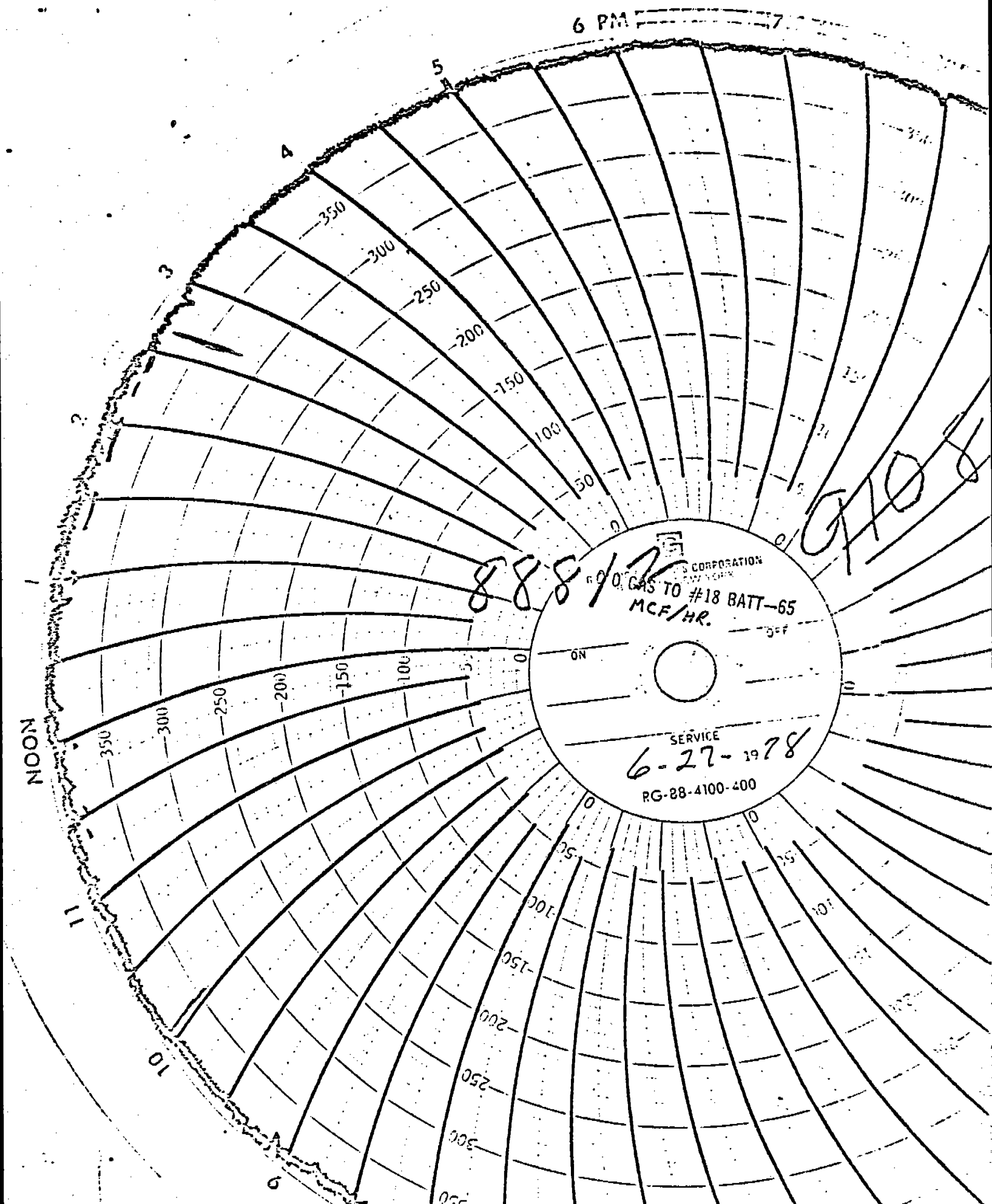

5 NEW STACK BANDS
AT PLATFORM SEE 116850
(MUST CLEAR EXIST. BANDS)
250'
EL. 1387'-8
T/GRTG.
℄ CABLE LUGS
℄ TEST PORTS
11'
6'
5'
TEST PLATFORM
SEE 116844
EXIST. LADDER
TO BE CUT @
TEST PLATFORM
SEE 116844
NEW
LADDER
EL. 1340'-8
T/GRTG.
97'-0
LANDING & LADDERS
SEE 116845
50'
NEW

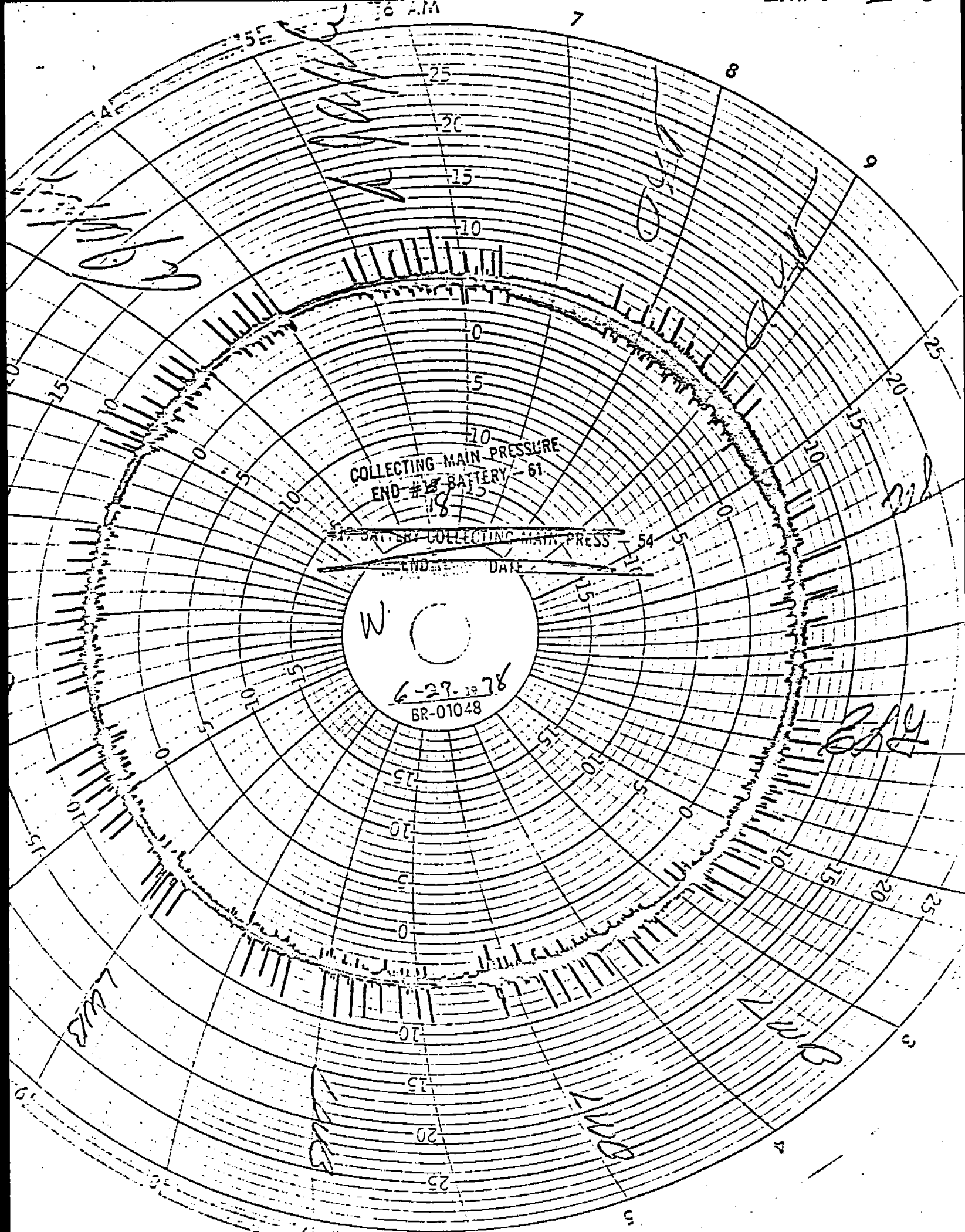
EXHIBIT VI-B

Coking Record (8-2-78)

Oven #	Time Pushed	Time Charged	Coking Hr.	Coking Min.
14	1522	1533	18	13
24	1530	1543	18	12
34	1540	1558	18	16
44	1549	1606	17	56
54	1609	1623	18	05
64	1619	1629	18	07
74	1625	1639	18	01
84	1635	1653	18	03
6	1648	1703	17	20
16	1658	1744	17	20
26	1741	1753	17	52

EXHIBIT V-B.


6 PM
7
5
4
3
2
1
NOON
11
10
9
350
300
250
200
150
100
50
0
GAS TO #18 BATT—65
MCF/HR.
ON
OFF
SERVICE
6-27-1978
RG-88-4100-400
888172
G108



COLLECTING MAIN PRESSURE
END #18 BATTERY - 61
BATTERY COLLECTING MAIN PRESS - 54
END DATE
W
6-27-1978
BR-01048

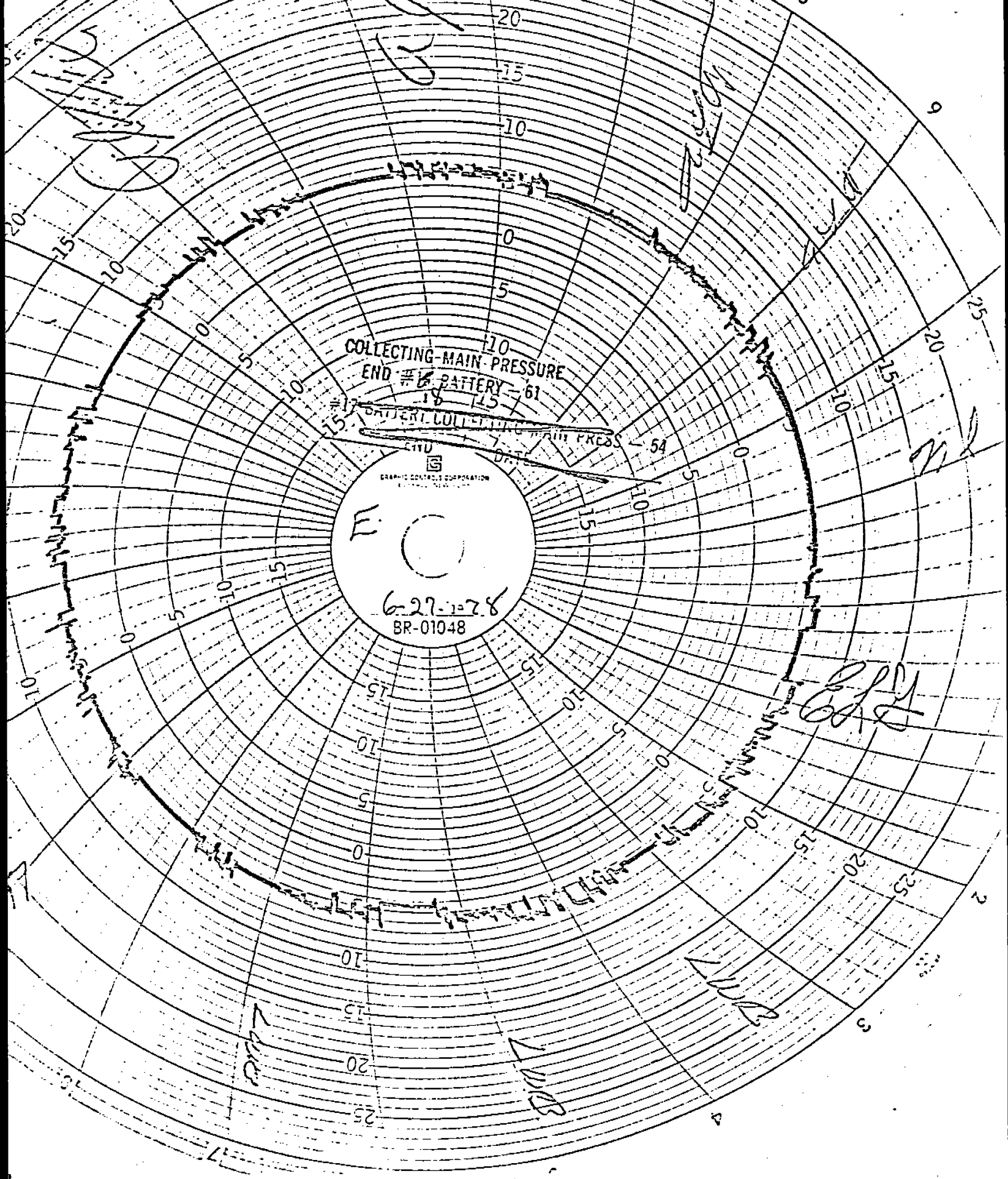
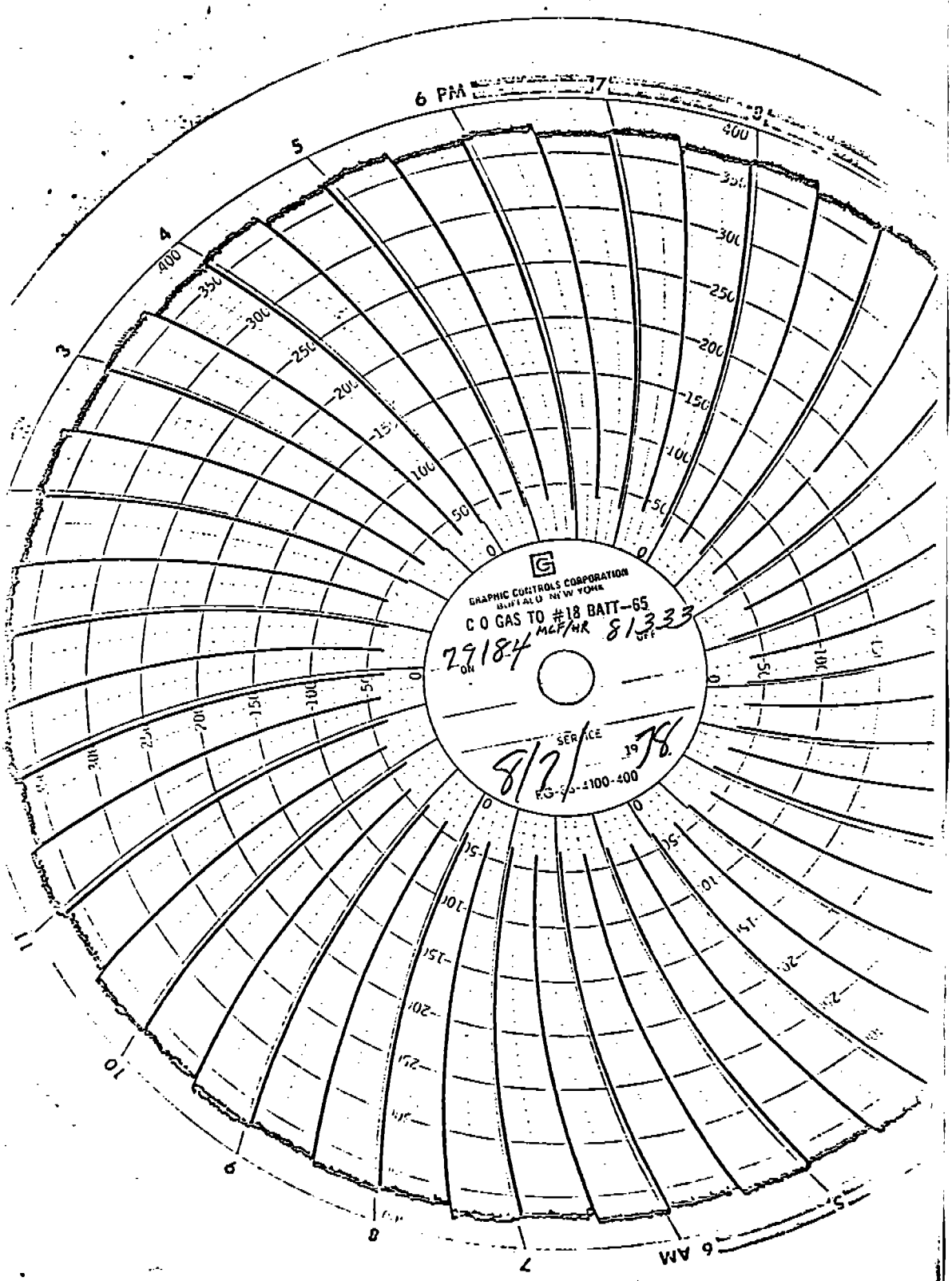

COLLECTING-MAIN PRESSURE
END #16 BATTERY - 61
#17 BATTERY COLLECTING MAIN PRESS - 54
END
DATE
GRAPHIC CONTROLS CORPORATION
6-27-1978
BR-01048

EXHIBIT XV-B



6 PM
6 AM
GRAPHIC CONTROLS CORPORATION
BUFFALO NEW YORK
C O GAS TO #18 BATT-65
MCF/HR
29184
81333
ON
OFF
SERVICE
8/7/ 1978

EXHIBIT XIV - B

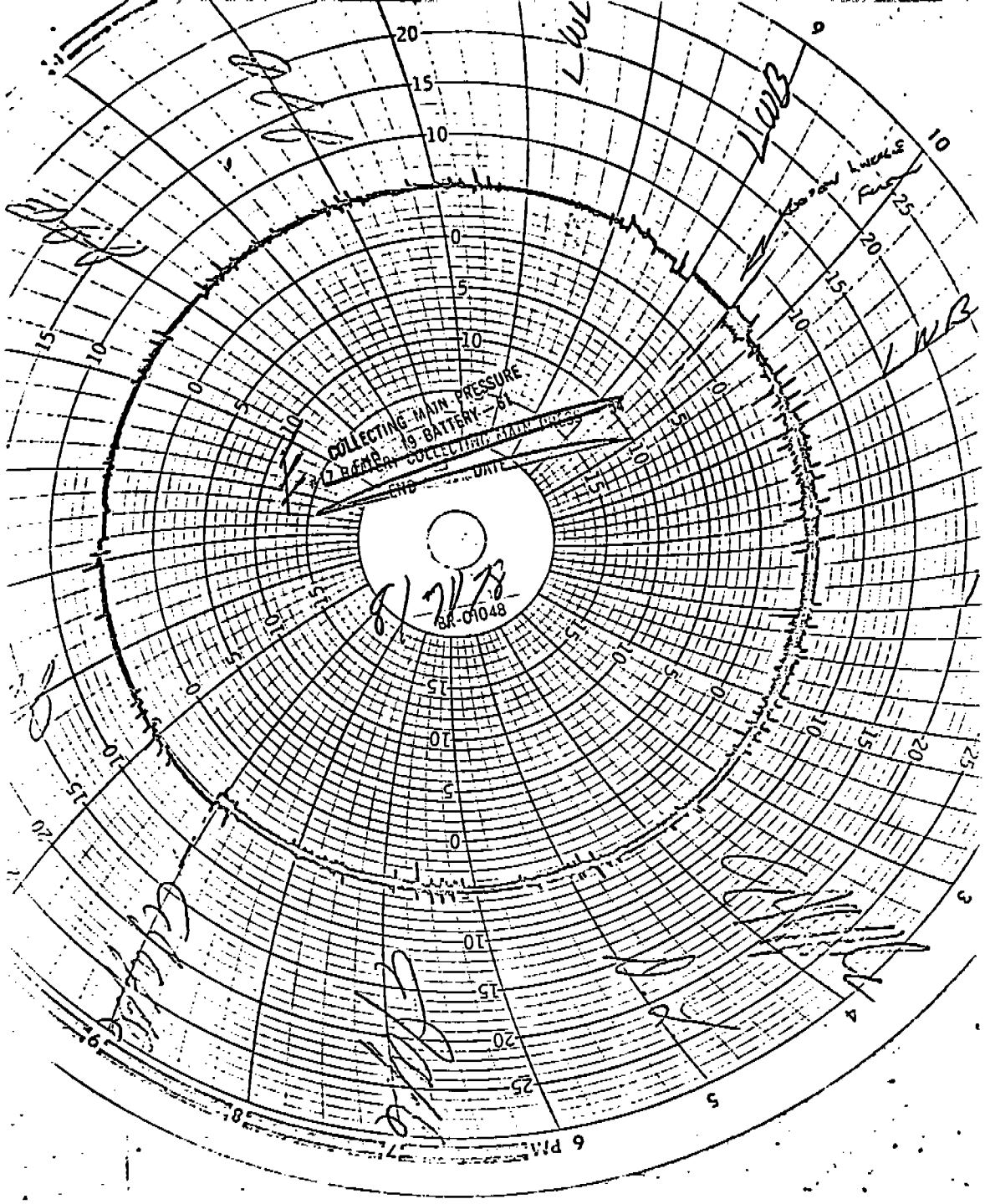

COLLECTING MAIN PRESSURE
BR-01048
LWB
LWB
LWB
6 PM

EXHIBIT XI-B

Coking Record (8-7-78)

Oven #	Time Pushed	Time Charged	Coking Hr.	Coking Min.
41	1045	1100	17	53
51	1055	1110	17	52
61	1105	1120	17	50
71	1115	1129	17	50
81	1124	1138	17	37
3	1136	1148	17	34
13	1146	1212	17	37
33	1210	1255	17	52
43	1253	1305	18	27
53	1303	1315	18	22
63	1313	1324	18	29
73	1322	1333	18	25
83	1331	1343	17	56
5	1341	1352	17	59
15	1350	1402	18	00
25	1400	1410	17	55
35	1408	1419	17	53
45	1417	1428	17	24
55	1426	1433	17	22
65	1515	1527	18	03
75	1525	1540	18	04

Replaces Form 21280 — DAILY PRODUCTION WORKSHEET — EXHIBIT XII - B

DATE: 8/7/78

	DAILY QUANTITY	%	TO-DATE QUANTITY	%
COAL CARB				
LOW VOLATILE	367		2629	
HIGH VOLATILE	1162		8325	
TOTAL COAL	1529		10954	
COKE	1085		7768	
BREEZE	53	3.47	389	3.55
SURPLUS	9825		70169	
TAR STILL				
17 BATTERY				
18 BATTERY	8596		60356	
19 BATTERY				
WASTED	14		515	
TOTAL	18435	12.06	131040	11.96
TAR PROD/USED	11850	7.75	84894	
REC/SHIPPED I.D.	-		-	
SHIP OUTBOUND	X X X	X X X	X X X X	X X
TAR ACID OIL	-		-	
PITCH	-		-	
AM SULPHATE	30580	20.00	219080	
LIGHT OIL	5351	3.50	38339	
RECEIVED	-		-	
LOSS	-		2365	
CR SOLV NAPH	-		979	
PRIMARY OIL	-		5177	
BTX	-		38784	

BREEZE: H_2O 16.2 Dry Fracture 83.8

TKS	DES	SIZE	TONS WET	TONS DRY
5	SP		63	53
	FM			
	BF			
	PH			
5			63	53

DAILY [illegible] COAL [illegible]

BAT	LV		
17		77 / 15	
18		77 / 15	
19		77 / 15	
TOT			

WET COAL T/D 11605 : 16.25

TEMP	AMPS	
		66° ACID RECD 1 TKS
		66° ACID O/H 239 TONS
2409	219	% VM MIXED COAL 30.0
		% H_2O MIXED COAL 6.8

SHIP/USED	SHIPPED T/D	ON HAND	✓
-	-	X X X X X X X X	
-	-	195224	✓
9000	97730	X X X X X X X	
-	-	=	
-	-	-	
-	-	7616 3232473	
-	47305	16282	
X X X X X X	X X X X X X	X X X X X X X	
X X X X X X	X X X X X X	X X X X X X X	
-	-	5881	
-	5177	0	
82198	82198	96586	

OVENS TOT	OVENS OPR	OVENS PUSHED 11-7	7-3	3-11	TOTAL	16.08 COAL 93.2 WET	DRY	71.0 COKE	COKING TIME GROSS	NET	OVENS PUSHED T/D	COKE PROD T/D	AVG COKE RATE
77									:	:			
77	77	34	34	34	102	1640	1529	1085	18:07	17:56	714	7768	1110
74									:	:			
228									:	:			

KE ON WHEELS	FKLN	RDLE	STOCK	PURCH	AVG	TYPE	ROSEDALE DELAYS:
H YESTERDAY	37						
ADED + +			5				
LOADED BF	7						
LOADED STOCK							
IPPED + +							
H TODAY	35						

CAP	OPER	SCHED	PUSH	COKE	SURP GAS	COKE T/D	RATE	COKE SUL	COKE ASH	LV STOCK
LE								Cal.		
LN	77	102	102	1085			34000	Det.		9045
TAL								REACTIVITY	STABILITY	

DAY	RALT	TAO	LO	TAR					8144
T/D		-							

& PITCH METER	TODAY	TO-DATE	✓	17	18	19	AVG	TYPE	FRANKLIN DELAYS: 1'19"
IR TOTAL					49			O	CT
R TOTAL					30			M	#19 QUENCHER UNIT - [illegible]

LO- 327 33 065
BP TAR- 203 [illegible]
VELVET- 7,776
T/D- 7.91

BANK	R	17	18	19
OLD BAL				
+or -				
NEW BAL				

ACT. COAL WT. 16.2[illegible]

EXHIBIT X-B

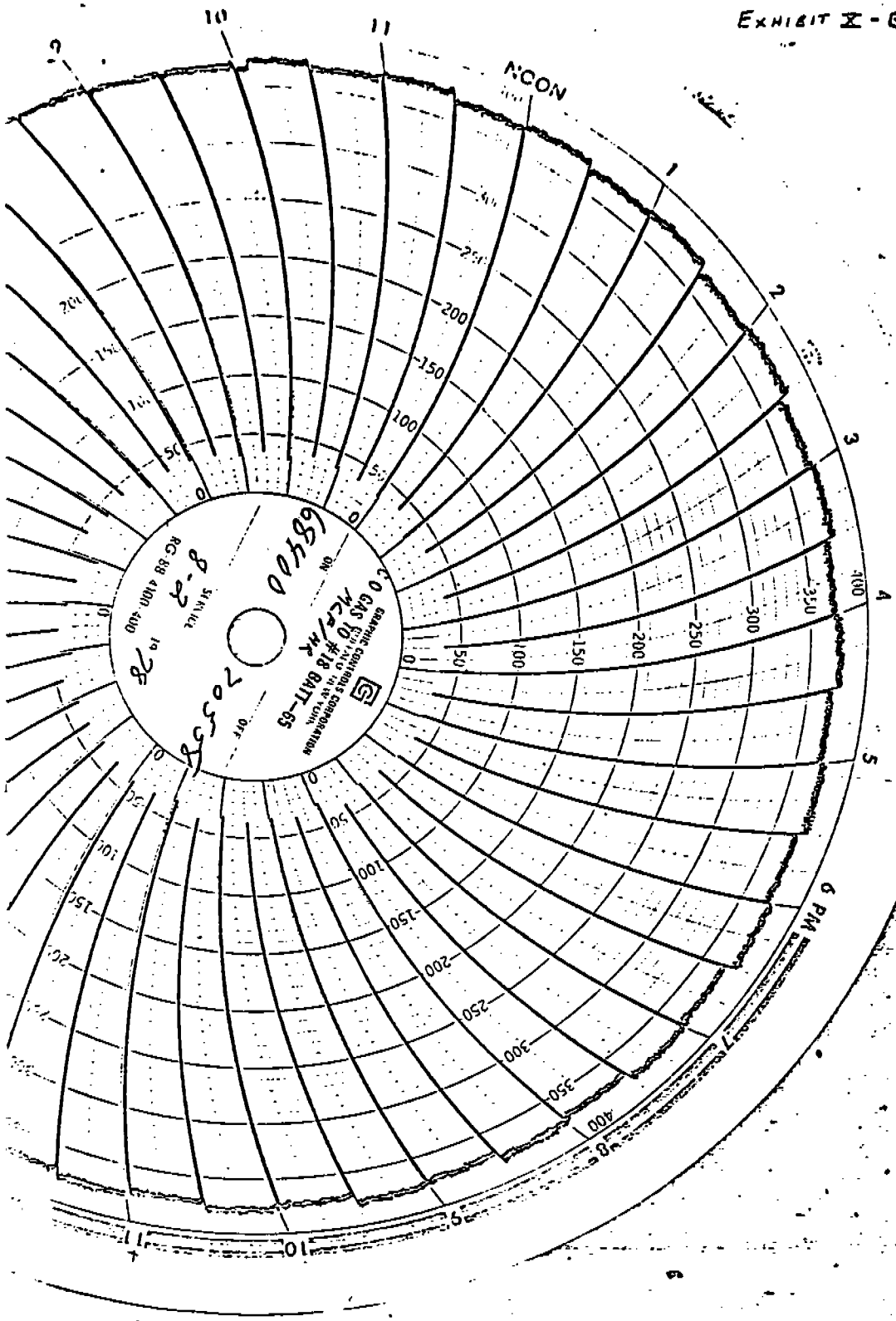

NOON
6 PM
GRAPHIC CONTROLS CORPORATION
CO GAS 10 #18 BATT-65
MCF/HR
ON
OFF
SERVICE
RG-88 4100-400
68400
70538
8-2
19 78

EXHIBIT IV-B

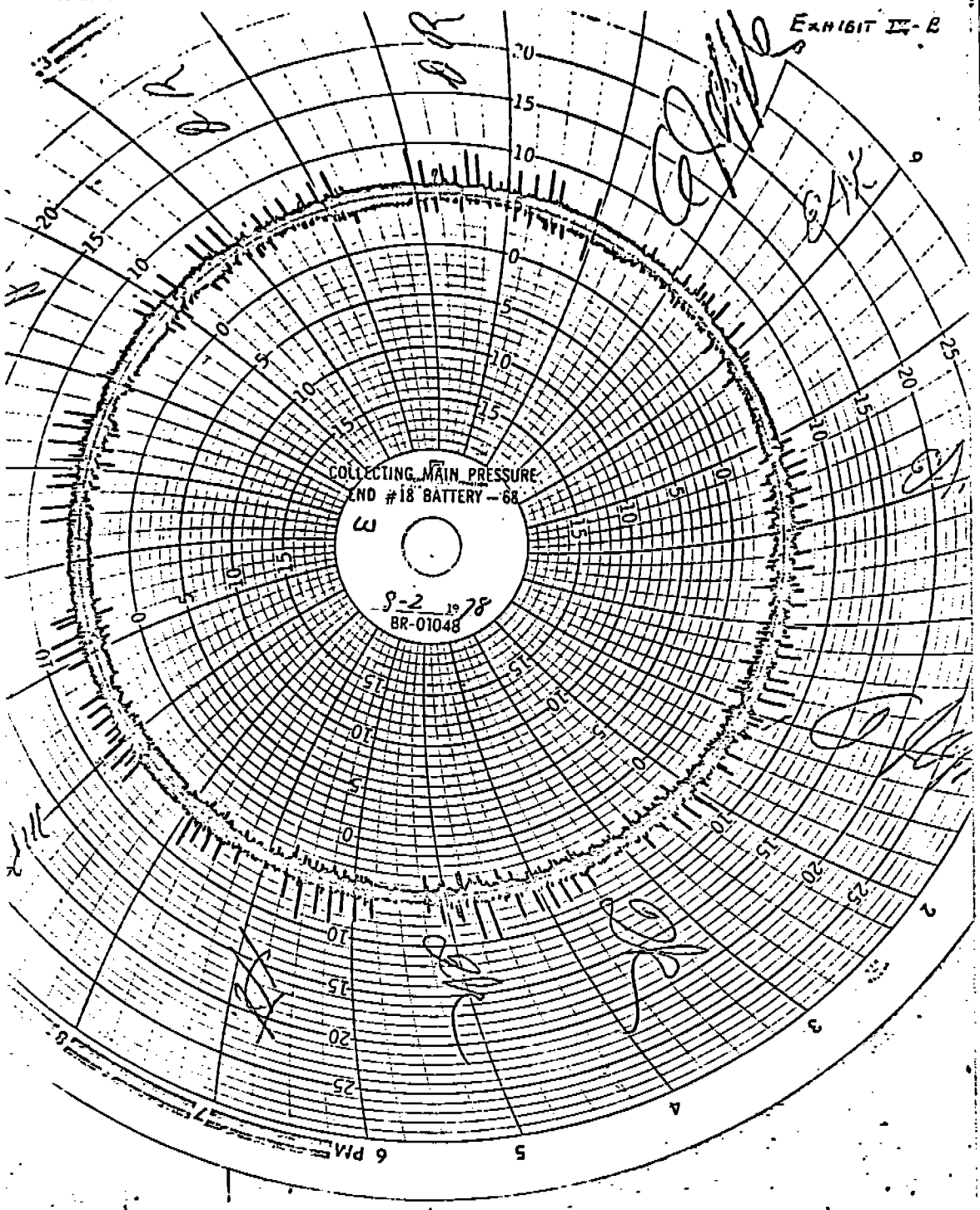


EXHIBIT VIII - B

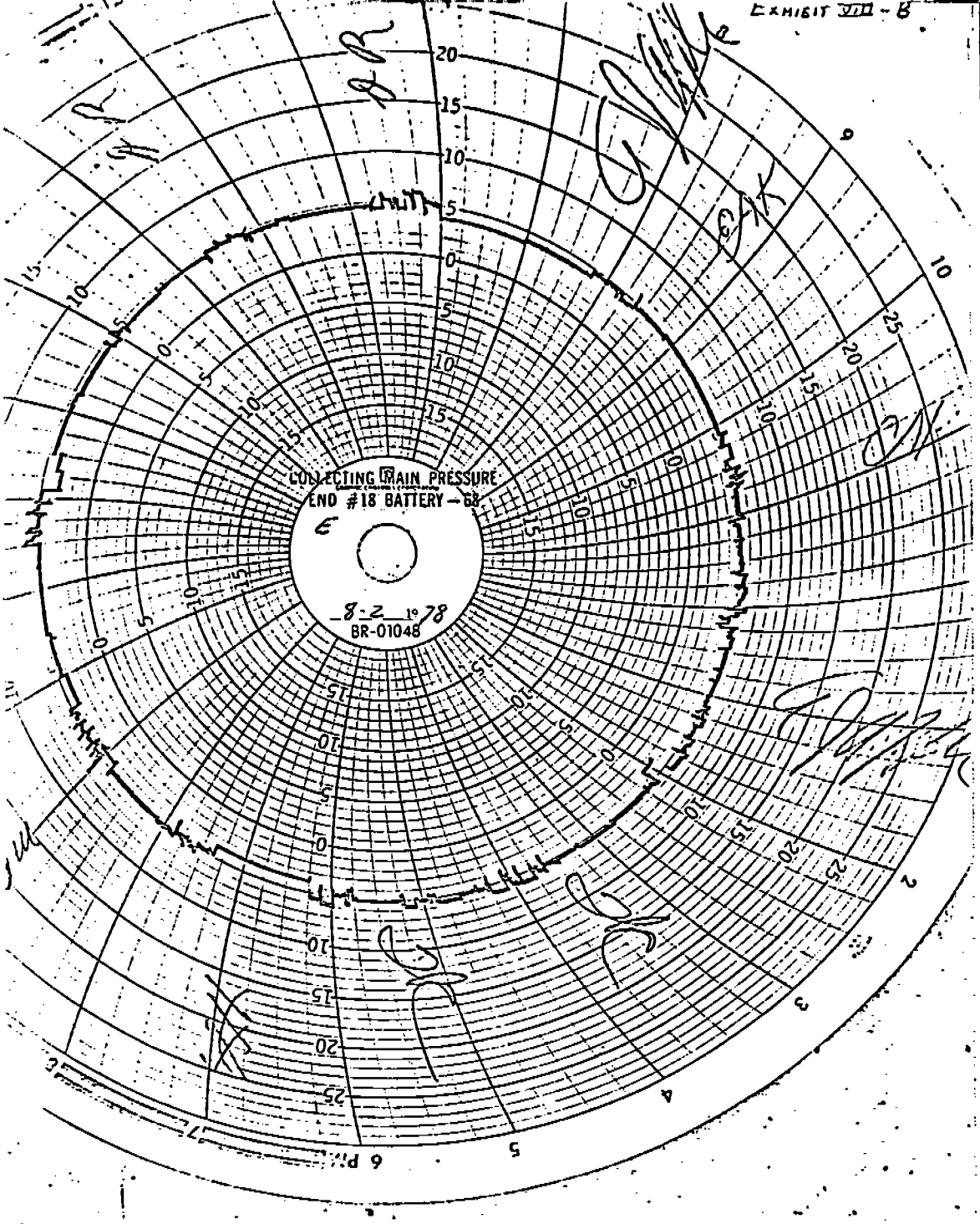


EXHIBIT VII-B

DATE: 8/2/78

COAL CARB	DAILY QUANTITY	%	TO-DATE QUANTITY	%
LOW VOLATILE	374		748	
HIGH VOLATILE	1186		2369	
TOTAL COAL	1560		3117	
COKE	1106		2210	
BREEZE	53	3.40	117	3.75
SURPLUS	10086		20128	
TAR STILL				
17 BATTERY				
18 BATTERY	8632		17252	
19 BATTERY				
WASTED	85		175	
TOTAL	18803	12.05	37559	12.05

BRIEF: H_2O 16.2 Dry Fracture 83

TKS	DES	SIZE	TONS WET	TONS DRY
3	SP		38	32
2	FM		25	21
	BF			
	PH			
5			63	53

DAILY [illegible] COAL [illegible]

BAT	LV		
17		22/15	
18		22/15	
19		15/15	
TOT			

WET COAL T/D 3295 : 16.15

TEMP	AMPS
2420	221

66° ACID RECD 1 TKS
66° ACID O/H 233 TONS
% VM MIXED COAL 30.3
% H_2O MIXED COAL 5.4

					SHIP/USED	SHIPPED T/D	ON HAND	✓
TAR PROD/USED	12090	7.75	24157		-	-	XXXXXXXX	
REC/SHIPPED I.D.	-		-		-	-	182682	✓
SHIP OUTBOUND	XXX	XXX	XXXX	XX	17900	49535	XXXXXXX	
TAR ACID OIL	-		-		-	-	=	
PITCH	-		-		-	-	-	
AM SULPHATE	31200	20.00	62340		-	-	1531 3075733	
LIGHT OIL	5460	3.50	10910		-	47305	11147	
RECEIVED	-		-		XXXXXX	XXXXXX	XXXXXXX	
LOSS	-		2365		XXXXXX	XXXXXX	XXXXXXX	
CR SOLV NAPH	-		979		-	-	5881	
PRIMARY OIL	-		5177		-	5177	0	
BTX	-		38784		-	-	178784	

OVENS TOT	OVENS OPR	OVENS PUSHED 11-7	7-3	3-11	TOTAL	16.17 COAL 94.6 WET	DRY	70.9 COKE	COKING TIME GROSS	NET	OVENS PUSHED T/D	COKE PROD T/D	AVG COKE RATE
77									:	:			
77	77	34	34	34	102	1649	1560	1106	18:07	17:56	204	2210	1105
74									:	:			
222									:	:			

KE ON WHEELS	FKLN	RDLE	STOCK	PURCH	AVG	TYPE	ROSEDALE DELAYS:
H YESTERDAY	30						
ADED + +			9				
LOADED BF	8						
LOADED STOCK							
IPPED + +							
H TODAY	31						

CAP	OPER	SCHED	PUSH	COKE	SURP GAS	COKE T/D	RATE	COKE SUL	COKE ASH	LV STOCK
E								Col.		
N	77	☆102	☆102	☆1106			☆34000	Det.		10064
FAL								REACTIVITY	STABILITY	

DAY	SALT	TAO	-	LO	TAR				☆ 9058
T/D			-						

& PITCH METER	TODAY	TO-DATE	✓	17	18	19	AVG	TYPE	FRANKLIN DELAYS: ☆
IP TOTAL					31			M	QUENCHER UNIT - CLEANING
TOTAL									QUENCHER SPRAYS
LO- 3.87 36702					20			O	#3 LARRY - COAL HANGING - UP
BR TAR- 184000									IN HOPPERS
VELVET- 1318									
T/D- 5.38									

BANK	R	17	18	19
OLD BAL				
+or -				
NEW BAL				

Koppers Form 21280 — DAILY PRODUCTION WORKSHEET — Exhibit II-B

DATE 1/27/78

COAL CARB	DAILY QUANTITY	DAILY %	TO-DATE QUANTITY	TO-DATE %
LOW VOLATILE	381		10141	
HIGH VOLATILE	1144		30423	
TOTAL COAL	1525		40564	
COKE	1093		29146	
BREEZE	79	5.18	1238	3.03
SURPLUS	9125		250171	
TAR STILL				
17 BATTERY				
18 BATTERY	9080		235252	
19 BATTERY				
WASTED	25		949	
TOTAL	18230	11.95	486372	11.99
TAR PROD/USED	11971	7.85	318427	
REC/SHIPPED I.D.	-		-	
SHIP OUTBOUND	X X X X X X		X X X X	X X
TAR ACID OIL	-		-	
PITCH	-		-	
AM SULPHATE	28975	19.00	770716	
LIGHT OIL	5429	3.56	144408	
RECEIVED	-		-	
LOSS	-		6934	
CR SOLV NAPH	-		4650	
PRIMARY OIL	-		9675	
BTX	-		117424	

BRICKS: H_2O 8.9 Dry Factor 19.1

TKS	DES	SIZE	TONS WET	TONS DRY
5	SP		61	49
2	FM		25	20
1	BF		12	10
	PH			
5			98	79

DAILY	COAL W.	
DAT	LV	
17		22 / 15
18		25 / 15
19		15 / 15
TOT		
WET COAL T/D		
43222	16.15	

TEMP	AMPS	
		66° ACID FEED — TPS
		66° ACID O/H 240 TONS
2428	195	% VM MIXED COAL 29.6
		% H_2O MIXED COAL 6.0

	SHIP/USED	SHIPPED T/D	ON HAND	✓
TAR PROD/USED	-	-	X X X X X X X X	
REC/SHIPPED I.D.	-	-	169108	✓
SHIP OUTBOUND	12478	312197	X X X X X X X X	
TAR ACID OIL	-	-	-	
PITCH	-	-	-	
AM SULPHATE	-	-	100% 2015509	✓
LIGHT OIL	-	138683	20916	✓
RECEIVED	X X X X X X	X X X X X X X	X X X X X X X	
LOSS	X X X X X X	X X X X X X X	X X X X X X X	
CR SOLV NAPH	-	5301	6421	✓
PRIMARY OIL	-	9675	0	✓
BTX	-	100014	162415	✓

OVENS TOTOPR	OVENS PUSHED 11-7	7-3	3-11	TOTAL	16.22 COAL WET	DRY	94.0 COKE	71.7	COKING TIME GROSS	NET	OVENS PUSHED T/D	COKE PROD T/D	AVG COKE RATE
77									:	:			
77 77	34	32	34	100	1622	1525	1093		18:29	18:18	2676	29146	10 79
75									:	:			
22E									:	:			

COKE ON WHEELS	FKLN	RDLE	STOCK	PURCH	AVG	TYPE	ROSEDALE DELAYS:
YESTERDAY	8						
PUSHED + +			10				
LOADED BF	11						
LOADED STOCK							
SHIPPED + +							
TODAY	7						

CAR	OPER	SCHED	PUSH	COKE	SURP GAS	COKE T/D	RATE	COKE SUL	COKE ASH	LV STOCK
5								Cal.		
77	77	102	100	1093			32000	Det.		19370
5								REACTIVITY	STABILITY	
A		T A O	-	L O		T A R				17433
75			-							

PITCH METER	TODAY	TO-DATE	✓	17	18	19	AVG	TYPE	FRANKLIN DELAYS:
TOTAL					32			5	[illegible]
TOTAL					18			0	Dead [illegible]

LO- 32 54 427
BP TAR- 175 000
REVET- 5 592
T/D- 7.94

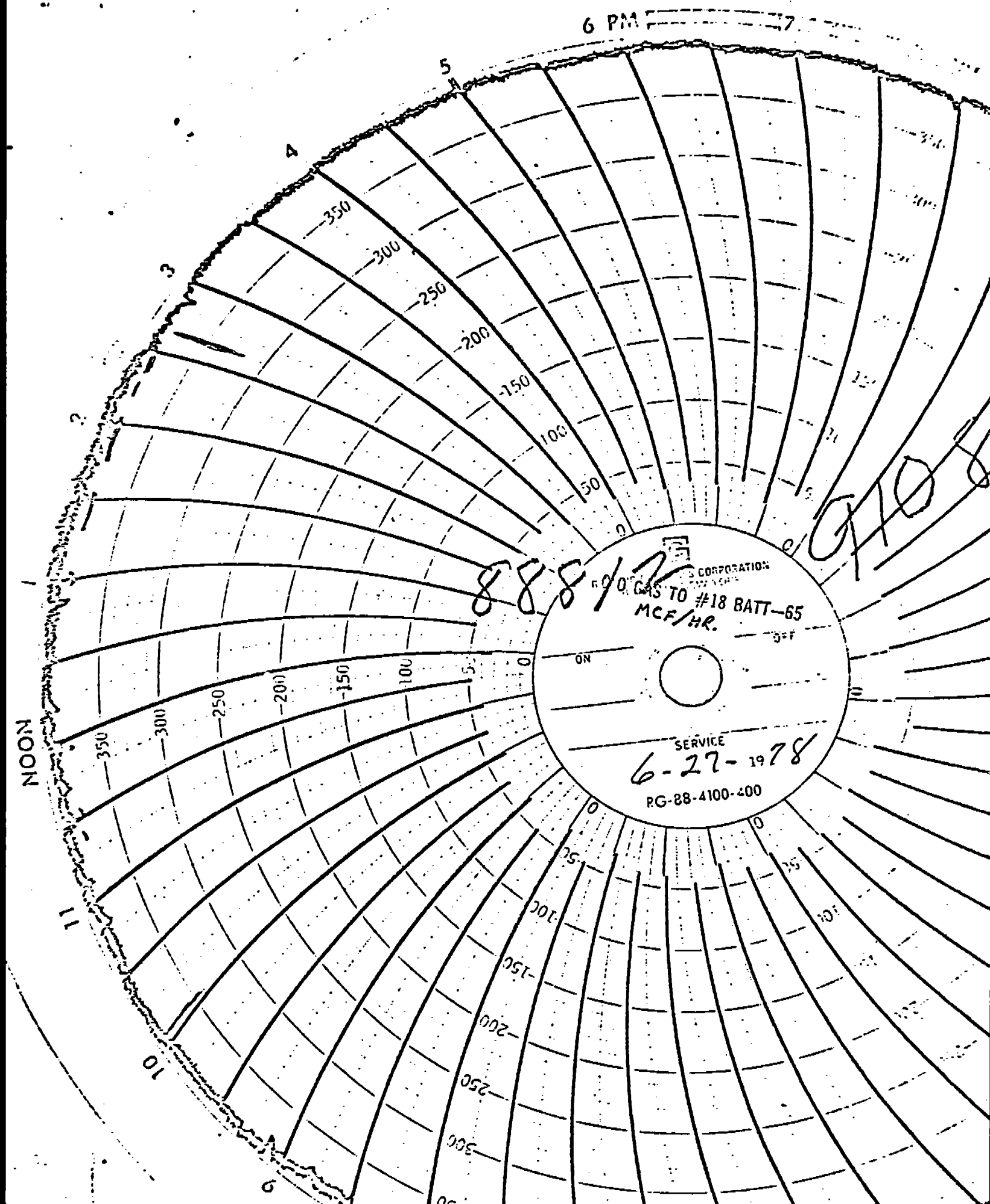
BANK	R	17	18	19
OLD BAL				
+or -				
NEW BAL				

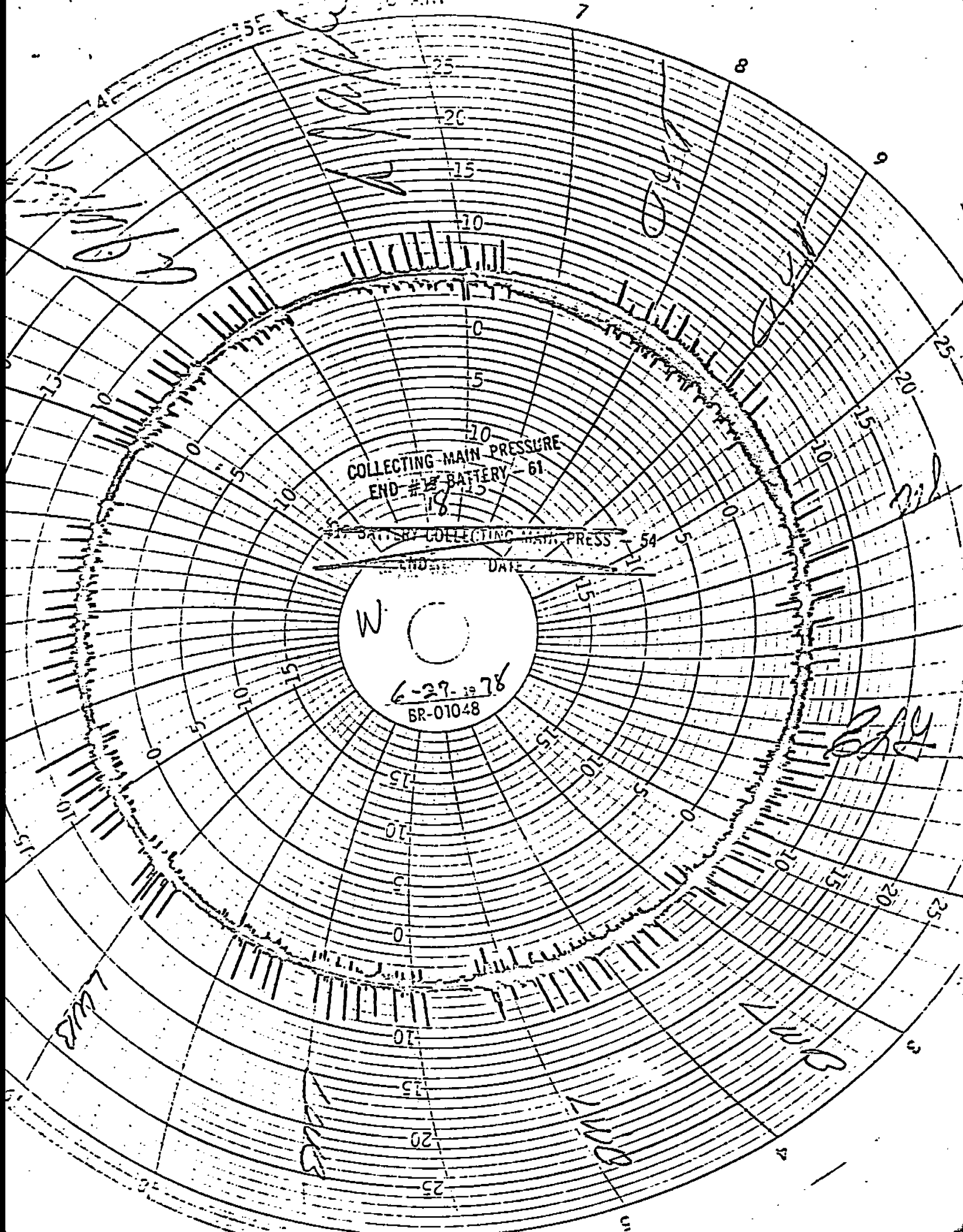
EXHIBIT VI-B

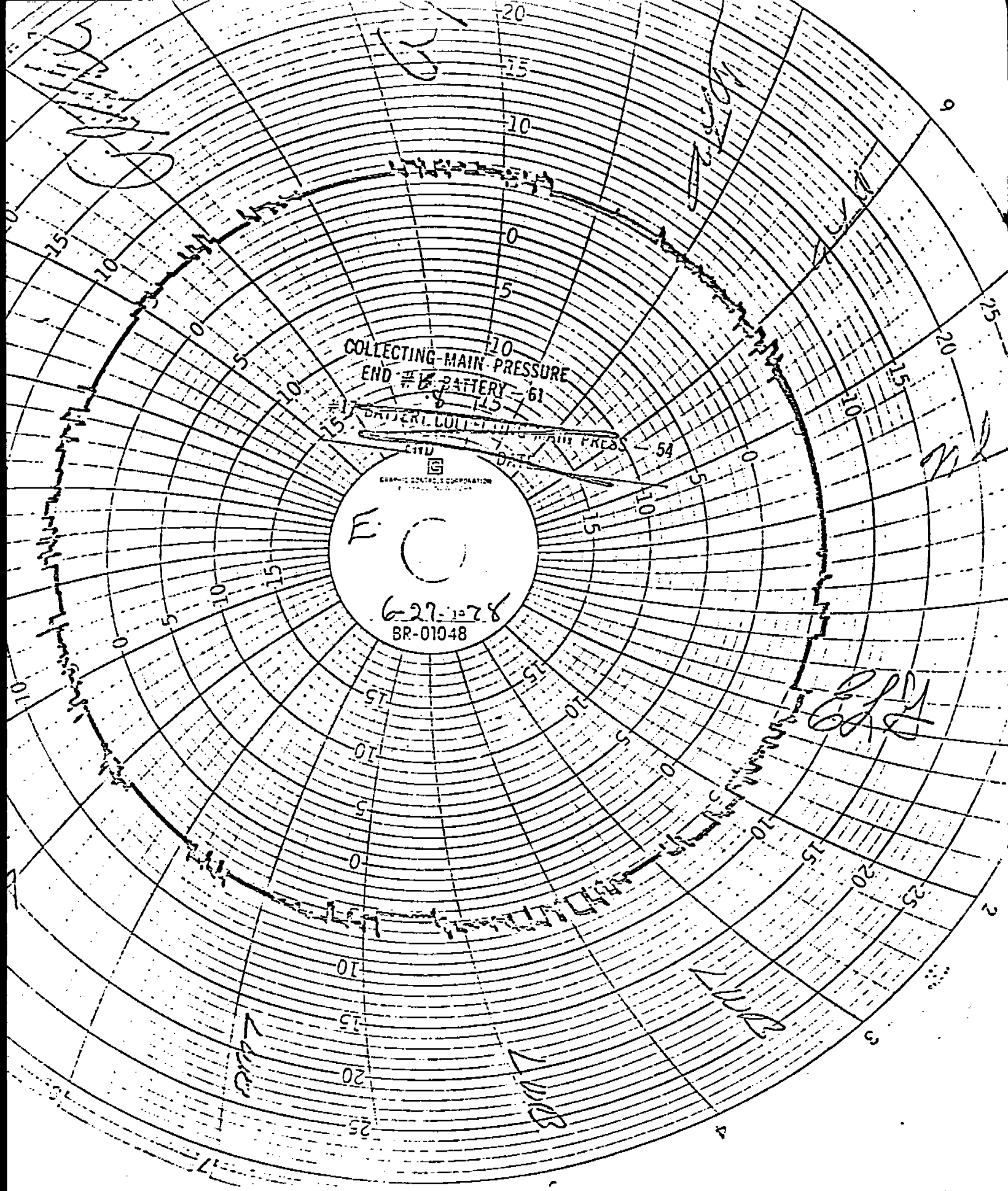
Coking Record (8-2-78)

Oven #	Time Pushed	Time Charged	Coking Hr.	Coking Min.
14	1522	1533	18	13
24	1530	1543	18	12
34	1540	1558	18	16
44	1549	1606	17	56
54	1609	1623	18	05
64	1619	1629	18	07
74	1625	1639	18	01
84	1635	1653	18	03
6	1648	1703	17	20
16	1658	1744	17	20
26	1741	1753	17	52

EXHIBIT V-B


6 PM
7
5
4
3
2
1
NOON
11
10
9
350
300
250
200
150
100
50
0
888/12
9108
CORPORATION
0 GAS TO #18 BATT—65
MCF/HR.
ON
OFF
SERVICE
6-27-1978
RG-88-4100-400


COLLECTING-MAIN PRESSURE
END #1 BATTERY - 61
BATTERY COLLECTING MAIN PRESS - 54
END DATE
W
6-27-78
BR-01048


COLLECTING-MAIN PRESSURE
END #16 BATTERY — 61
#17 BATTERY COLLECTING MAIN PRESS — 54
END
DATE
GRAPHIC CONTROLS CORPORATION
E
6-27-1978
BR-01048

SOTDAT/STEEL LIBRARY SYSTEM

Report Title:

Plant and Location: BSC, Johnstown, PA

SCC: 30300306

Testing Date(s): 6/27/78, 8/2/78 + 8/7/78

By Whom: company

Stack Test Review Attached:

Reviewed by:

Problems Seen by Reviewer:

Confidentiality Status: Clear

If status is confidential, list confidential pages or sections:

Source of Determination of the Confidentiality Status: Memo entitled: "Steel Technical Support Materials", From: Edward Reich, Director DSSE. To: Tom Voltaggio

Report Encoded by:

Date Encoded:

Form Numbers:

Comments:

Title: —

Plant and Location: BSC, Johnstown, PA

SCC: 30300306

Test Date: 6/27/78, 8/2/78 + 8/7/78

By Whom: company

Encoded By: GL

Date Encoded: 3/31/80

Completed By:

Form No.: E00200, E00201, E00202